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EXAMINER
KARACSONY, ROBERT

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,598	VAZQUEZ ET AL.	
	Examiner	Art Unit	
	ROBERT KARACSONY	2821	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19 and 21-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19 and 21-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to amendments received September 15, 2008. Claims 1-19 and 21-24 are pending.

Claim Objections

2. Claim 1 is objected to because of the following informalities:

3. In line 7, claim 1, replace "surface impedance" with --a surface impedance--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-9 are rejected under 35 U.S.C. 102(b) as being anticipated by *Takahashi et al.* (US 5,416,492, hereinafter *Takahashi*).

Claim 1: *Takahashi* teaches a device for controlling electromagnetic radiation emitted by a structure, the device having a first surface (1, fig. 59) and a second reactive surface (61, fig. 59) defining a cavity therebetween (fig. 60), the second reactive surface comprising a lattice array of conductors disposed on a dielectric surface (62, fig. 60) such that the displacement between a conductor and any other conductor adjacent to it is small compared to the wavelength of the electromagnetic radiation thereby causing the array of conductors to represent an effectively continuous conductive surface to the electromagnetic radiation, wherein a surface impedance of the second reactive surface is reactive; and

an emitter (12d and 12e, fig. 59) generating electromagnetic radiation between the first surface and the second reactive surface, wherein the electromagnetic radiation within the cavity, is radiated into the air through the second reactive surface (col. 14/line 64 through col. 15/line 25).

Claim 2: *Takahashi* teaches the dielectric surface is planar (fig. 60).

Claim 3: *Takahashi* teaches the electromagnetic radiation has more than one wavelength (col. 1/lines 12-16).

Claim 4: *Takahashi* teaches the electromagnetic radiation has more than one polarization (col. 15/lines 21-25).

Claims 5 and 6: *Takahashi* teaches wherein the surface impedance of the second reactive surface is inductive/capacitive (capacitance is present between adjacent conductive elements of '61' and inductance is present in each element of '61').

Claim 7: *Takahashi* teaches the surface impedance of the second reactive surface is capacitive in some regions of the dielectric surface and inductive in the remaining regions of the dielectric surface (fig. 59).

Claim 8: *Takahashi* teaches the magnitude of the surface impedance of the second reactive surface varies at different positions on the dielectric surface (fig. 59).

Claim 9: *Takahashi* teaches the conductors of the second reactive surface are substantially periodically disposed with respect to each other on the dielectric surface (fig. 59).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Takahashi* in view of *Iwai Masato* (JP04269001, hereinafter *Iwai*).

Claim 10: *Takahashi* teaches an antenna comprising a conductive equipotential surface (1, fig. 60); using a device for controlling electromagnetic radiation emitted by a structure, the device having a reactive element (61, fig. 59) comprising a lattice array of conductors disposed on a dielectric surface (62, fig. 60) such that the displacement between a conductor and any other conductor adjacent to it is small compared to the wavelength of the electromagnetic radiation thereby causing the lattice array of conductors to represent an effectively continuous conductive surface to the electromagnetic radiation, wherein the surface impedance of the conductive surface is reactive, the reactive element of which is disposed parallel to the equipotential surface to form a cavity therebetween (fig. 60); an emitter (12d and 12e, fig. 59) for emitting electromagnetic radiation that is guided in the cavity, between the equipotential surface and the reactive element.

Takahashi fails to teach an actuating mechanism for adjusting the displacement between the equipotential surface and the reactive element so that the angle of propagation of a beam of electromagnetic radiation that leaks through the reactive element can be varied. However, *Iwai* teaches using an actuating mechanism for adjusting a direction of a main beam of the leaky wave antenna (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the actuating mechanism of *Iwai* with the invention of *Takahashi* in order to have adjusted the direction of a main beam of the antenna.

Claim 11: The modified invention of *Takahashi* teaches a method of directing a beam of electromagnetic radiation using an antenna according to claim 10, the method comprising causing the emitter to emit electromagnetic radiation; guiding the electromagnetic radiation between the equipotential surface and the reactive element; and adjusting the displacement between the equipotential surface and the reactive element using the actuating mechanism so that the angle of propagation of the beam of electromagnetic radiation that leaks through the reactive element is set to a predetermined value (Abstract of *Iwai*).

Claim 12: The modified invention of *Takahashi* teaches a method of scanning a beam of electromagnetic radiation using an antenna according to claim 10, the method comprising causing the emitter to emit electromagnetic radiation; guiding the electromagnetic radiation between the equipotential surface and the reactive element; and cyclically varying the displacement between the equipotential surface and the reactive element using the actuating mechanism so that the angle of propagation of the beam of electromagnetic radiation that leaks through the reactive element oscillates between two values (Claim 12 is considered a suggested use limitation and is not given any patentable weight. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987).).

8. Claims 13, 16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Noujeim* (US 7,002, 517, hereinafter *Noujeim*) in view of *Takahashi*.

Claim 13: *Noujeim* teaches an antenna for controlling electromagnetic radiation emitted comprising a conductive equipotential surface (510, fig. 5) and a second reactive surface (530,

fig. 5) defining a cavity therebetween, the second reactive surface comprising an array of conductors disposed on a dielectric surface (520, fig. 5) such that the displacement between a conductor and any other conductor adjacent to it is small compared to the wavelength of the electromagnetic radiation thereby causing the array of conductors to represent an effectively continuous conductive surface to the electromagnetic radiation, wherein surface impedance of the second reactive surface is reactive; and

an emitter (640, fig. 6) generating electromagnetic radiation between the equipotential surface and the second reactive surface, wherein the electromagnetic radiation within the cavity is radiated into the air through the second reactive surface, wherein the second reactive surface of which is disposed parallel to the equipotential surface; the emitter emits electromagnetic radiation that is guided between the equipotential surface and the second reactive surface; and a layer of active dielectric material disposed between the equipotential surface and the second reactive surface wherein the angle of propagation of a beam of electromagnetic radiation that leaks through the second reactive surface can be varied by adjusting a biasing potential across the layer of active dielectric material (Abstract).

Noujeim fails to teach a lattice array of conductors. However, *Takahashi* teaches a leaky wave antenna comprising a lattice array of conductors (fig. 59) that may be used for multiple polarizations (col. 15/lines 21-25). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the lattice structure of *Takahashi* as the design of the invention of *Noujeim* in order to have utilized multiple polarizations.

Claim 16: The modified invention of *Noujeim* teaches the emitter is a dual polarization collimated source or is a dual polarized planar feed or a conformal array feed (col. 15/lines 21-25 of *Takahashi*).

Claim 18: *Noujeim* teaches a method of directing a beam of electromagnetic radiation using an antenna according to claim 13, the method comprising causing the emitter to emit electromagnetic radiation; guiding the electromagnetic radiation between the equipotential surface and the second reactive surface; and adjusting the biasing potential across the equipotential surface and the second reactive surface so that the angle of propagation of the beam of electromagnetic radiation that leaks through the second reactive surface is set to a predetermined value (Abstract).

Claim 19: *Noujeim* teaches a method of scanning a beam of electromagnetic radiation using an antenna according to claim 13, the method comprising causing the emitter to emit electromagnetic radiation; guiding the electromagnetic radiation between the equipotential surface and the second reactive surface; and cyclically varying the biasing potential across the equipotential surface and the reactive element so that the angle of propagation of the beam of electromagnetic radiation that leaks through the second reactive surface oscillates between two values (Claim 19 is considered a suggested use limitation and is not given any patentable weight. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987).).

9. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Noujeim* in view of *Takahashi* and *Iwai*.

Claim 14: *Noujeim* in *Takahashi* teaches all of the limitations of claim 13, however, fail to teach an actuating mechanism for adjusting the displacement between the equipotential surface and the second reactive surface so that the angle of propagation of the beam of electromagnetic radiation that leaks through the second reactive surface can be varied. However, *Iwai* teaches using an actuating mechanism for adjusting a direction of a main beam of the leaky wave antenna (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the actuating mechanism of *Iwai* with the modified invention of *Noujeim* in order to have adjusted the direction of a main beam of the antenna.

Claim 15: The modified invention of *Noujeim* teaches the actuating mechanism comprises a hydraulic actuator or a piezoelectric actuator, or an electric motor (Abstract of *Iwai*).

10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Noujeim* in view of *Takahashi* and *Varadan* (US 5,557,286, hereinafter *Varadan*).

Claim 17: The modified invention of *Noujeim* teaches all of the limitations of claim 13, however, fails to teach the active dielectric is titanium dioxide. However, *Varadan* teaches using barium strontium titanate since it exhibits highly tunable dielectric constants which enable a substantial variation in an electrical phase shift there through (col. 3/lines 60-64). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used barium strontium titanate as the active dielectric of *Noujeim* since it exhibits highly tunable dielectric constants which enable a substantial variation in an electrical phase shift there through.

11. Claims 1, 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Yamamoto* (JP2002374123, hereinafter *Yamamoto*) in view of *Takahashi*.

Claim 1: *Yamamoto* teaches a device for controlling electromagnetic radiation emitted by a structure, the device having a first surface (21, fig. 1) and a second reactive surface (35, fig. 1) defining a cavity therebetween, the second reactive surface comprising an array of conductors disposed on a dielectric surface (23, fig. 1) such that the displacement between a conductor and any other conductor adjacent to it is small compared to the wavelength of the electromagnetic radiation thereby causing the array of conductors to represent an effectively continuous conductive surface to the electromagnetic radiation, wherein a surface impedance of the second reactive surface is reactive; and

an emitter (33, fig. 1) generating electromagnetic radiation between the first surface and the second reactive surface, wherein the electromagnetic radiation within the cavity, is radiated into the air through the second reactive surface (Abstract).

Yamamoto fails to teach a lattice array of conductors. However, *Takahashi* teaches a leaky wave antenna comprising a lattice array of conductors (fig. 59) that may be used for multiple polarizations (col. 15/lines 21-25). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the lattice structure of *Takahashi* as the design of the invention of *Yamamoto* in order to have utilized multiple polarizations.

Claim 21: *Yamamoto* teaches the first surface is an equipotential surface (fig. 1).

Claim 22: *Yamamoto* teaches the first surface presents a capacitive surface impedance (the surface will inherently present a capacitive surface impedance).

Claim 23: *Yamamoto* teaches the cavity is formed using a printed circuit board substrate (23) with the second reactive surface (35) being printed on a top layer of the substrate and plated through holes (29) connecting a top layer to a bottom layer which forms the first surface as an opposite boundary, the plated through holes thereby forming sides of the cavity.

12. Claim 24: *Yamamoto* teaches the emitter is printed (The limitation "printed" merely recites a method of forming a device. The method of forming a device is not germane to the issue of patentability of the device itself, therefore, these limitations have not been given patentable weight.) on an inner layer of a substrate (fig. 1).

Response to Arguments

13. Applicant's arguments with respect to claims 1-19 and 21-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT KARACSONY whose telephone number is (571)270-1268. The examiner can normally be reached on M-F 7:30 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas W. Owens can be reached on 571-272-1662. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. K./
Examiner, Art Unit 2821

/Hoang V Nguyen/
Primary Examiner, Art Unit 2821